

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1-6. (Cancelled)

7. (Currently Amended) An image processing method ~~according to claim 1,~~
~~wherein the image capture means is~~ for estimating an output image from input images,
the method comprising:

capturing the input images by using a single-plane sensor, wherein pixels of the
input images correspond to n pixel values and to at least one in which a color signal;

detecting a positional relationship among the input images;

~~observed~~ observing the at least one color signal by using the single-plane
sensor, wherein the observed color signal varies depending on the position of each
positions of the input images ~~[[image]]~~;

estimating the output image by identifying pixel components for pixel positions of
the output image, the pixel components being identified from the input images; and

producing the output image based on the identified pixel components, wherein
the output image corresponds to (n+1) or more pixel values for pixels of the output
image.

8. (Currently Amended) An image processing method ~~according to claim 1,~~
~~wherein~~ for estimating an output image from input images, the method comprising:

~~the image capture means captures~~ capturing the plurality of input images with underexposure, wherein pixels of the input images correspond to n pixel values;

detecting a positional relationship among the input images;

estimating the output image by identifying pixel components for pixel positions of the output image, the pixel components being identified from the input images;

producing the output image based on the identified pixel components, wherein the output image corresponds to (n+1) or more pixel values for pixels of the output image; and

~~the image processing method further comprises the step of correcting the exposure underexposure by increasing gain gaining up each pixel value of the plurality of input images the n pixel values.~~

9. (Currently Amended) An image processing method according to claim 8, wherein ~~the step of estimating the output image comprises the steps of:~~

~~determining a corrected position of each pixel~~ pixels of the output image, based depending on the positional relationship detected in the detection step for each pixel of each of the plurality of input images;

~~producing a light intensity integral constraint formula indicating that the~~ to control ~~a difference between the integral of light intensity in a region centered at the corrected position and a pixel value of a pixel at the corrected position should be less than a predetermined error;~~ and

~~calculating the light intensity integral constraint formula~~ to maintain the difference at a level less than a predetermined error.

10. (Currently Amended) An image processing method according to claim 9, wherein ~~by when~~ the light intensity integral constraint formula is used to change the predetermined error based on a factor of the increase in gain ~~is produced, if the plurality of input images have been gained up, the error is changed depending on the factor of the gaining up.~~

11-24. (Cancelled)

25. (New) An image processing method according to claim 7, further comprising:

converting analog signals, representing the input images, to digital signals; and
using the digital signals to detect the positional relationship.

26. (New) An image processing method according to claim 7, further comprising:

encoding a signal representing the output image; and
storing the encoded output image.

27. (New) An image processing method according to claim 7, further comprising:

converting a digital signal representing the output image to an analog signal; and
displaying the output image using the analog signal.

28. (New) An image processing method according to claim 7, further comprising:
operating a shutter at a controlled speed; and
capturing the input images by exposing the single-plane sensor to light using the shutter.

29. (New) An image processing method according to claim 8, further comprising:
converting analog signals, representing the input images, to digital signals; and
using the digital signals to detect the positional relationship.

30. (New) An image processing method according to claim 8, further comprising:
encoding a signal representing the output image; and
storing the encoded output image.

31. (New) An image processing method according to claim 8, further comprising:
converting a digital signal representing the output image to an analog signal; and
displaying the output image using the analog signal.

32. (New) An image processing method according to claim 8, further comprising operating a shutter at a controlled speed to control capturing of the input images.

33. (New) An image processing apparatus for estimating an output image from input images, comprising:

means for capturing the input images by using a single-plane sensor, wherein pixels of the input images correspond to n pixel values and to at least one color signal;

means for detecting a positional relationship among the input images;

means for observing the at least one color signal by using the single plane sensor, wherein the observed color signal varies depending on positions of the input images;

means for estimating the output image by identifying pixel components for pixel positions of the output image, the pixel components being identified from the input images; and

means for producing the output image based on the identified pixel components, wherein the output image corresponds to $(n+1)$ or more pixel values for pixels of the output image.

34. (New) An image processing apparatus according to claim 33, further comprising means for converting analog signals, representing the input images, to digital signals and using the digital signals to detect the positional relationship.

35. (New) An image processing apparatus according to claim 33, further comprising:

means for encoding a signal representing the output image; and
means for storing the encoded output image.

36. (New) An image processing apparatus according to claim 33, further comprising:

means for converting a digital signal representing the output image to an analog signal; and
means for displaying the output image using the analog signal.

37. (New) An image processing apparatus according to claim 33, further comprising means for exposing the single-plane sensor to light at a controlled speed, wherein the single-plane sensor captures the input images based on the controlled speed.

38. (New) An image processing apparatus for estimating an output image from input images, comprising:

means for capturing the input images with underexposure, wherein pixels of the input images correspond to n pixel values;
means for detecting a positional relationship among the input images;

means for estimating the output image by identifying pixel components for pixel positions of the output image, the pixel components being identified from the input images;

means for producing the output image based on the identified pixel components, wherein the output image corresponds to $(n+1)$ or more pixel values for pixels of the output image; and

means for correcting the underexposure by increasing gain of the n pixel values.

39. (New) An image processing apparatus according to claim 38, wherein the means for estimating the output image is configured to:

determine a corrected position of pixels of the output image, based on the positional relationship;

produce a light intensity integral constraint formula to control a difference between the integral of light intensity in a region centered at the corrected position and a pixel value of a pixel at the corrected position; and

calculate the light intensity integral constraint formula to maintain the difference at a level less than a predetermined error.

40. (New) An image processing apparatus according to claim 39, wherein the light intensity integral constraint formula is used to change the predetermined error based on a factor of the increase in gain.

41. (New) An image processing apparatus according to claim 38, further comprising:
means for converting analog signals, representing the input images, to digital signals; and
means for using the digital signals to detect the positional relationship.

42. (New) An image processing apparatus according to claim 38, further comprising:
means for encoding a signal representing the output image; and
means for storing the encoded output image.

43. (New) An image processing apparatus according to claim 38, further comprising:
means for converting a digital signal representing the output image to an analog signal; and
means for displaying the output image using the analog signal.

44. (New) An image processing apparatus according to claim 38, further comprising means for exposing the single-plane sensor to light at a controlled speed, wherein the single-plane sensor captures the input images based on the controlled speed.

45. (New) A computer readable storage medium storing instructions, which when executed on a processor, cause the processor to perform a method for estimating an output image from input images, the method comprising:

- capturing the input images by using a single-plane sensor, wherein pixels of the input images correspond to n pixel values and to at least one color signal;

- detecting a positional relationship among the input images;

- observing the at least one color signal by using the single plane sensor, wherein the observed color signal varies depending on positions of the input images;

- estimating the output image by identifying pixel components for pixel positions of the output image, the pixel components being identified from the input images; and

- producing the output image based on the identified pixel components, wherein the output image corresponds to $(n+1)$ or more pixel values for pixels of the output image.

46. (New) A computer readable storage medium storing instructions, which when executed on a processor, causes the processor to perform a method for estimating an output image from input images, the method comprising:

- capturing the input images with underexposure, wherein pixels of the input images correspond to n pixel values;

- detecting a positional relationship among the input images;

- estimating the output image by identifying pixel components for pixel positions of the output image, the pixel components being identified from the input images;

producing the output image based on the identified pixel components, wherein the output image corresponds to $(n+1)$ or more pixel values for pixels of the output image; and

correcting the underexposure by increasing gain of the n pixel values.